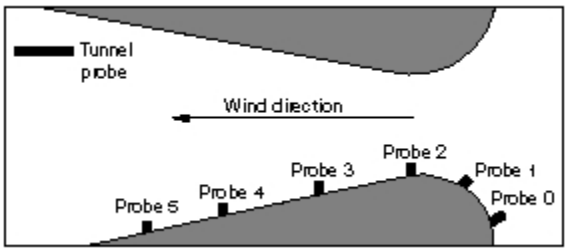
A Vision in Aeronautics--The K-12 Wind Tunnel Project

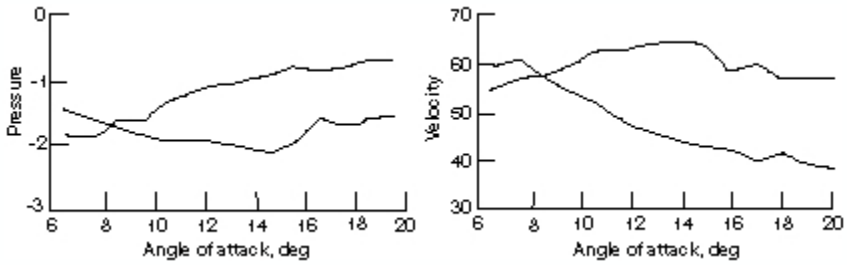
A Vision in Aeronautics, a project within the NASA Lewis Research Center's Information Infrastructure Technologies and Applications (IITA) K-12 Program, employs small-scale, subsonic wind tunnels to inspire students to explore the world of aeronautics and computers. Recently, two educational K-12 wind tunnels were built in the Cleveland area. During the 1995-1996 school year, preliminary testing occurred in both tunnels.

At General Benjamin O. Davis Jr. Aviation High School, the students conducted three wind tunnel experiments. In the first one, they analyzed a venturi (see the first figure). After collecting velocity and pressure data through the tunnel's instrumentation, the students used the data to create computer-generated graphs displaying the relationship of velocity and pressure.



Tunnel instrumentation.

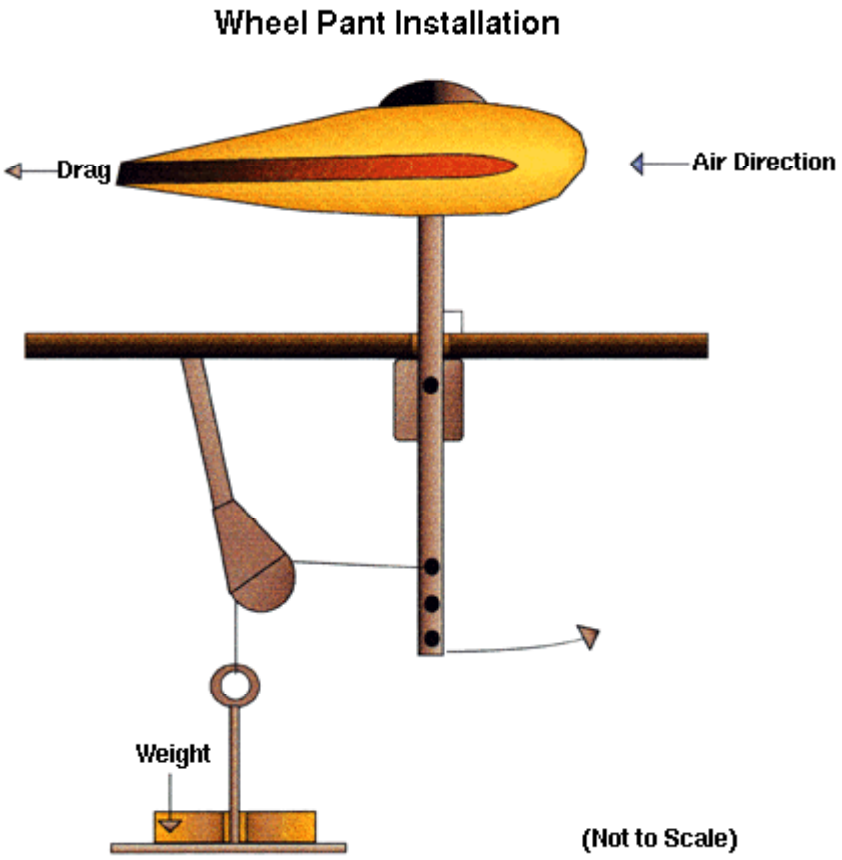
In the second experiment, the students observed an airfoil at various angles of attack. They visually observed the tufts on the airfoil as it was rotated from a horizontal position to a steep angle of attack. Then, they plotted the velocity and pressure readings at various angles (as shown in the following figure).



Pressure and velocity differences at various angles of attack.

Their third project was the wheel pant project, a research project conducted by NASA Lewis Research Center's Structural Systems Branch to design a more aerodynamic wheel cover for small aircraft. Helping out with this real-world research project, students performed initial tests of Lewis' wheel pant design in Aviation High School's K-12 wind tunnel. The tests indicated that the covered wheel will provide some additional drag reduction. By working with the students and using this educational tunnel, NASA researchers were able to expedite their research on this project instead of waiting for a

schedule opening for the heavily used NASA wind tunnels.



Wheel pant installation.

At Barberton High School, the wind tunnel was used for a pine car drag race. Students designed cars with features they believed would make their cars the fastest. Then the cars were tested in the tunnel to find the car with the least amount of drag.

At both schools, the student participants learned a great deal about aeronautics. They will have a head start on their college studies should they pursue aeronautics further.

Students at General Benjamin O. Davis Aviation High School test an airfoil in the school's educational wind tunnel.

During the 1996-1997 school year, these tunnels will be opened up to students in other schools through the use of the Internet. Students at remote schools will be able to build a test object and send it to the school with the tunnel it is to be tested in. While the test is being conducted, desk-top video conferencing and electronic data transfer will allow students at the remote school to observe testing in real time.